AD

MISCELLANEOUS PUBLICATION 20

IMMUNOFLUORESCENCE, AN ANNOTATED BIBLIOGRAPHY

V. DIAGNOSTIC APPLICATIONS AND REVIEW ARTICLES

Warren R. Sanborn

MARCH 1968

DEPARTMENT OF THE ARMY
Fort Detrick
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Technical Information Division
AEROBIOLOGY AND EVALUATION LABORATORY

FA	fluorescent antibody
FIC	fluorescein isocyanate
FITC	fluorescein isothiocyanate
FTA	fluorescent treponemal antibody
FTA abs	fluorescent treponemal antibody absorbed
FTA-200	a modification of the above based on serum dilution
PAP	primary atypical pneumonia
PAS	para-aminosalicylic acid
PBS	phosphate-buffered saline
RB 200	a. lissamine rhodamine RB 200 b. lissamine rhodamine B 200 c. lissamine rhodamine B d. sulphorhodamine B e. acid rhodamine B
TPFA	Treponema pallidum fluorescent antibody
TPI	Treponema pallidum immobilization

Generally, the citations follow the format prescribed by the second edition of Style Manual for Biological Journals, American Institute of Biological Sciences, 2000 P Street, N.W., Washington, D.C., 20036. Abbreviations follow "American Standard for Periodical Title Abbreviations," Z39.5-1963, American Standards Association Incorporated, New York.

The compiler began to collect this immunofluorescence literature in 1957 while he was stationed at U.S. Navy Preventive Medicine Unit No. 2, Norfolk, Virginia. The literature collection became more intense and organized after 1959 when he was transferred to Fort Detrick, Frederick, Maryland. Following his further transfer to the Microbiology Department of the Naval Medical Research Institute, Bethesda, Maryland, in 1963, he continued this work with the encouragement and support of both of these latter installations. Work on the second edition began in 1964, and it has continued through support from both the U.S. Army and the Bureau of Medicine and Surgery of the U.S. Navy. This volume was completed while the compiler was assigned to U.S. Navy Medical Research Unit No. 3, FPO, New York, 09527, where he is currently serving as head of the Bacteriology Department.

The information in these volumes was originally recorded on coded marginal punch cards. With the compilation of this publication, the citations and annotations have been transcribed on punched tape for conversion to automatic data processing and for use in updating later editions. Each entry is coded for recall by authors, date, title, and source publication to allow compilation of more selective listings.

Readers are invited to report errors or suggest added entries to the compiler or to Editorial Branch, Technical Information Division, Fort Detrick, Frederick, Maryland, 21701, for improvement of the subsequent editions. Reader assistance in this area will be deeply appreciated.

ACKNOWLEDGMENTS

The essential team effort required for development of this immunofluorescence bibliography cannot be overstressed. As with many projects of this nature, the talents, advice, guidance, and assistance of many people led to the completion of this second edition. The compiler is deeply grateful to the many people who have contributed.

Financial support for this project at first was absorbed by the Pathology Division and the Walter Reed Army Medical Unit, Fort Detrick. However, completion of the first edition (through 1962) was made possible by special financial assistance from Physical Defense Division, Fort Detrick, under Dr. Charles R. Phillips. I am extremely grateful to him for his aid. Expenses for this second edition were primarily met through a generous grant from U.S. Navy Bureau of Medicine and Surgery, Preventive Medicine Division, under CAPT J. Millar, MC, USN. Many administration expenses also were borne by the Naval Medical Research Institute and by Fort Detrick.

A number of libraries kindly donated their services. In spite of the unusual requests required by this project, these libraries were very helpful and willingly assisted, often providing valuable suggestions. Libraries primarily involved were the Technical Library, Fort Detrick, under Mr. Charles N. Bebee and later Miss Joyce A. Wolfe, and the Technical Reference Library, Naval Medical Research Institute, Mrs. T.P. Robinson, librarian. Much valuable assistance was also rendered by the National Institutes of Health Library, Miss R. Connelly, reference librarian, the National Library of Medicine, and the library of the Walter Reed Army Medical Unit, Fort Detrick. The staff members of these libraries were both helpful and patient. Without such fine assistance, the work could not have been completed

It is a pleasure to acknowledge the highly competent secretarial help. Secretaries providing their capable and untiring talents were: Miss Sandra Rosenblatt, Miss Linda L. Zimmerman, Mrs. Marguerite M. Matovich, Mrs. Gene Heaven, Mrs. Linda Franklin, Mrs. Alberta Brown, Mrs. Margaret Raheb, and a number of others. Valuable assistance in double-checking problem references was provided by Mrs. Catherine F. Eaves and Mrs. Mary J. Gretzinger. Dr. George H. Nelson was a willing consultant for classification problems. Dr. Harold W. Batchelor provided an essential key to the development of this work by introducing the compiler to marginal punch card systems and guiding him in their application.

The Technical Information Division, under Mr. Gerald W. Beveridge, continually provided all types of assistance in addition to a home base from which to work. My gratitude for this cannot be fully expressed.

Last, but by no means least, the essential editorial work receives my highest praise. The tireless efforts, patience, and driving force supplied by these people were the prime factors in bringing this edition to completion. Mrs. Madeline Warnock Harp, in charge, Mrs. Mary D. Nelson, and Mrs. Ruth P. Zmudzinski all spent many hard weeks of work on this project. I shall always be indebted to them.

ABSTRACT

This volume is one of a series of six in the second edition of an annotated bibliography on various aspects of immunofluorescence and its use. The first six-volume edition was published in 1965 and included citations for the period 1905 through 1962. The present edition covers the period 1963 through 1965; Volume V is divided into two major sections. The first section contains 104 annotated citations to review articles on immunofluorescence arranged according to major subject areas. The second section is devoted to diagnostic techniques. It contains 321 cross-references to citations in the other volumes of this series, arranged to correspond with subject matter areas in those volumes. A complete author index to the 425 citations is included.

CONTENTS

I. REVIEWS

A. GENERAL REVIEWS

7011

Anonymous. 1963. Illuminating antigens. Glaxo 26:34-42.

Basic procedures for using the direct and indirect methods of FA are outlined. Application in the rapid diagnosis of pathogenic bacteria and viruses is great. Among experimental applications, important advances have been made in intracellular detection of antibody and the immunoglobulins, localization of hormones, and the understanding of auto-immune phenomena. The specificity, versatility, and speed of the FA method should benefit many lines of work.

7012

Bauza, C.A. 1964. Fluorescent microscopy in pediatrics: Description and possibilities. Arch. Pediat. Urug. 35:244-248. In Spanish.

This is a review.

7013

Cherchenko, I.I. 1963. Fluorescent antibodies in microbiology. Zh. Mikrobiol. Epidemiol i Immunobiol. 40:2:93-101. In Russian.

This is a review.

7014

Federlin, K. 1965. Immunofluorescence. Deut. Med. Wochensch. 90:667-670. In German.

The reviewed method offers a valuable and dependable aid in experimental and clinical immunology.

7015

Geck, P.; Horvath, S.; Karasszon, D. 1963. Experience in immunofluorescent investigations using fluorescein isothiocyanate. Kiserl. Orv. 15:513-518. In Hungarian.

Immunofluorescence studies with fluorescein isothiocyanate are described. This is a review of methods.

7016

Giunti, G. 1963. On the theme of fluorescent histoimmunology. Riv. Anat. Patol. Oncol. 24:813-819. In Italian.

A review.

7017

Grundboeck, M. 1964. Fluorescent antibody method and its application in veterinary medicine. Med. Weter. 20:36-41. In Polish.

The use of fluorescein-labeled antibodies to detect antigens in tissues and cells is presented. The method has provided a useful contribution to the understanding of such diverse problems as the pathogenesis of infectious diseases, the fate of injected antigens, the formation of antibodies, the synthesis of hormones, etc. In the veterinary field, this method has been employed to study numerous diseases caused by viruses, bacteria, rickettsiae, fungi, and protozoa. Many reports on the application of immunofluorescent staining deal with potential diagnostic uses of the method.

7018

Gulmezoglu, E. 1964. Fluorescent antibody techniques. Turk. Ij. Tecr. Biyol. Derg. 24:181-197. In Turkish.

This is a technique and application review.

7019

Husain, S.S. 1964. Quality control in fluorescent antibody technique in the clinical lab. Hosp. Progr. 45:68-72.

This is a review.

7020

Mancini, L.; Rossi, M.; Beni, G. 1964. Present knowledge of immunofluorescence in medical microbiology. Med. Clin. Sperim. 14:51[illegible]-568. In Italian.

This is a review.

7021

Marquez-Monter, H. 1963. Fluorescence microscopy in medicine. Rev. Med. Hosp. Gen. 26:109-132. In Spanish.

This is a review.

7022

Martin, R.S. 1963. Fluorescent microscopy. Can. J. Med. Technol. 25:115-122.

The historical background of the development of the FA technique and the theory of fluorescence as an electronic phenomenon are discussed. Fluorescence is the absorption of light energy by a molecule (exciting or activating light) and its subsequent re-radiation within 1×10^{-7} seconds. Fluorescent emission of a molecule is sensitive to the physical and chemical conditions of its environment. Quantitative reports of the degree of brilliance of fluorescence obtained may be misleading. Requirements for fluorescent microscopic examination are discussed, including the optic system, filters, and preparation of the specimens. Very bright point sources of illumination are necessary; high pressure mercury arcs enclosed in quartz envelopes are recommended. Schematic representations of direct and indirect FA methods and the inhibition reaction that occasionally occurs are given.

7023

Schultz-Haudt, S.D. 1964. Immunohistochemistry. Tidsskr. Norske Laegeforen. 84:34-35. In Norwegian.

Immunohistochemical techniques are reviewed.

7024

Weir, D.M. 1963. Antigen-antibody reactions. Mod. Trends Immunol. 1:53-85.

In this review of the usefulness of various serologic tests, FA is included as a valuable tool for immunologic tracing.

B. APPLICABLE TO DIAGNOSIS

7025

Artenstein, M.S.; Demis, D.J. 1964. Recent advances in the diagnosis and treatment of viral diseases of the skin. New Engl. J. Med. 270:1101-1111.

A number of important disease-producing viruses remain to be propagated in the laboratory. Hepatitis, infectious mononucleosis, and, of course, tumor viruses head the list. The next decade may see the solution to these problems. The availability of effective viral chemotherapy will, in turn, result in greater emphasis on accurate and rapid diagnostic methods such as FA.

7026

Ashihara, Y. 1964. Recent advances in serodiagnosis of virus disease. Rinsho Byori 13:21-26. In Japanese.

Methods of serodiagnosis by detection of antigen (immunofluorescent staining and complement-fixation) and detection of antibody (neutralization test, red blood cell agglutination, complement-fixation, and immune adherence hemagglutination test) are discussed. Practical uses of fluorescent techniques in experimental diagnosis of 20 diseases are tabulated. A model for the technique is also presented. Advances in the other diagnostic methods are summarized.

7027

Babudieri, B. 1965. Tests for the diagnosis of toxoplasmosis with special reference to immunofluorescence. G. Mal. Infett. 17:119-129. In Italian.

A review.

7028

Berrier, H.H. 1964. Diagnostic aids for mycotic infections. Lab. Anim. Care 14:195-199.

In this general review of mycosis, the FA inhibition test for histoplasmosis is included as a suggested diagnostic tool.

7029

Blundell, G.P. 1963. International Congress of Clinical Pathology: Immunofluorescence. Brit. Med. J. 2:1258.

This is a brief report of a discussion by Dr. Blundell related to the employment of FA in diagnosis of microbial diseases.

7030

Brown, G.C. 1963 Fluorescent antibody techniques for the diagnosis of enteric infections. Arch. Ges. Virusforsch. 13:3-34.

This is a review giving specific directions for application of FA to viral diagnosis from clinical specimens

7031

Cheever, F.S. 1964. Labeling techniques in diagnosis of enterovirus infection. Bacteriol. Rev. 28:400-401.

This is a brief review of successful FA tests with enteroviruses. The author speculates on diagnostic and pathologic applications.

7032

Cherry, W.B.; Moody, M.D. 1965 Fluorescent antibody techniques in diagnostic bacteriology Bacteriol. Rev. 29:222-250.

This review presents a criterial evaluation of the current status of immunofluorescence as a technique for the diagnosis of bacterial infections in public health laboratories As with other new techniques, specific tests that succeed must offer better diagnostic service without increased cost, or diagnostic service equal in reliability to other tests but at reduced cost. Some of the applications have fulfilled the criteria. Outstanding are applications of FA to identification of Group A streptococci, serogrouping of enteropathogenic E. coli in fecal smears, identification of gonococcus in exudates, and use of indirect FA to detect the presence of syphilitic antibody Less advanced are applications of immunofluorescence to detection of the typhoid bacillus, identification of whooping cough bacillus, and screening of spinal fluid sediments for agents of bacterial meningitis FA reagents aid the clinician in making a rapid presumptive diagnosis of diphtheria in acute cases. Some examples of the massive use of FA tests in certain diagnostic public health laboratories are cited Two major problems impeding implementation of immunofluorescence in diagnostic work are those of unsatisfactory life of the mercury-arc lighting source and the scarcity of reliable diagnostic reagents Neither of these problems is insoluble.

7033

Coons, A.H. 1963. Fluorescent antibody method gains wider use in diagnosing infectious diseases. J. Amer. Med. Ass. 183:36.

This report of a talk by Dr. Coons indicates the future diagnostic possibilities of FA. The need for good standard reagents is emphasized.

7034

Coons, A.H. 1964. Labeling techniques in the diagnosis of viral diseases. Bacteriol. Rev. 28:397-399.

This is a brief review of diagnostic FA applications to virus diseases, present and potential. Rabies and smallpox are the two prime candidates for routine FA diagnosis. The nature of these diseases has successfully spurred efforts to put FA to use on them. It is suggested that to find a new virus, one need only bleed a convalescent patient, prepare a highly purified conjugate from this serum, and apply this FA reagent to buffy coats obtained from acutely ill patients. This approach is suggested for infectious mononucleosis and infectious hepatitis.

7035

Cruchaud, A. 1964. Immunofluorescence: Its origin, possibilities and limitations. Schweiz. Med. Wochensch. 94:1153-1157. In French.

The origins, principles, and standard techniques of immunofluorescence are reviewed. Although this technique was limited to experimental immunology at first, it soon became apparent that it could constitute a valuable aid to diagnosis in microbiological as well as in immune and autoimmune diseases. The different areas of application for immunofluorescence are discussed.

7036

de Azevedo, J.F.; Rombert, P.C. 1964. Immunofluorescent reaction applied to parasitological diagnosis. Rev. Inst. Med. Trop. Sao Paulo 6:35-45. In Portuguese.

The use of FA to diagnose schistosome and hydatid infections is described.

7037

Deinhardt, F. 1964. Diagnosis, prevention and treatment of virus disease. Chicago Med. 67:521-525

This resume includes mention of the use of FA in laboratory diagnosis of viral diseases.

7038

Gelfand, M. 1964. Criteria for making a diagnosis of schistosomiasis. J. Trop. Med. Hyg. 67:114-116.

A diagnosis of schistosomiasis can be made on any of the defined major criteria of the disease, viz. the presence of ova in either the stool or rectum, a positive appearance of the bladder mucosa on cytoscopy, and calcified bladder on X-ray. In the absence of these, at least two of the minor criteria must be present, provided that there is a definite history of exposure to infection. FA has a place in the recognition of the disease, and work up to the present time tends to indicate that it is one of the most valuable tests. At this point it would be safe to say it is a valuable indication of the presence of the disease.

7039

Gerbec, M. 1961. Rapid laboratory diagnosis by means of fluorescent antibodies. Vojnosanit Pregl. 18:574-579. In Serbo-Croatian.

This is a review of procedures and applications.

7040

Graber, C.D., Higgins, L.S.; Davis, J.S. 1965. Seldom-encountered agents of bacterial meningitis. J. Amer Med. Ass. 192:956-960.

In five cases of bacterial meningitis (one associated with a brain abscess) four seldom-encountered bacteria were identified as causative agents. Mima polymorpha, Listeria monocytogenes, Corynebacterium acnes, and Serratia marcescens. Various methods for culture of certain problem bacteria are suggested. FA conjugates for some of these agents can speed diagnosis.

7041

Gustafson, A.A.; Hundley, J B. 1962. Fluorescence microscopy: A new diagnostic tool in North Dakota. Proc. N. Dakota Acad Sci. 16:75-78.

The method has greatly facilitated diagnosis in streptococcal cases but has not been sufficiently tested for rabies and enteropathic Escherichia coli. BA-44-7351.

7042

Hamashima, Y. 1963. Rapid diagnosis by fluorescent antibody. Jap. J. Clin. Pathol. 11:467-475. In Japanese.

Streptococcus, Staphylococcus, Treponema pallidum and Toxoplasma gondii can be specifically detected by the fluorescent antibody technique. This technique is applicable for clinical use. This technique, if some related problems are solved, can also be applied to the detection of other pathogenic bacteria.

7043

Hers, J.F.Ph. 1963. Fluorescent antibody technique in respiratory viral diseases. Amer. Rev. Resp. Dis. 88:316-338.

Fluorescent antibody diagnosis of respiratory viral disease is rapid and sensitive. It also provides a tool for pathogenesis study. Among the diseases discussed are influenza, Eaton's agent, and psittacosis. The discussion is particularly informative.

7044

Hodgson, C.H.; Weed, L.A. 1964. Pulmonary mycosis: Diagnosis. Minn. Med. 47:1041-1045.

In detecting fungi, the value of the fluorescent antibody technique is limited. It is necessary to have on hand specific antisera for each organism to be tested, and these are not always available and often are not sufficiently sensitive or specific to give reliable information. In addition, organisms in the specimen may be too few for identification. The procedure is not available in all microbiology laboratories. When used properly, however, it may prove rapid and specific in its results.

7045

Holmes, A.W.; Deinhardt, F. 1965. Fluorescence microscopy: Some clinical and research applications. Presbyterian - St. Luke's Hosp. Med. Bull. 4:56-58.

The techniques of fluorescein tagging of antibodies and acridine orange staining are described briefly and some of their uses are discussed. These procedures, originating in the microbiology laboratory, are coming into ever-increasing use in the diagnosis and study of both infectious and noninfectious disease.

7046

Jeanes, A.L. 1964. The application of immunofluorescence techniques to the diagnosis of infection. Guys Hosp. Rep. 113:136-142.

In review, it has been shown that the fluorescent antibody tests may be applied to the investigation of all classes of microbiological infection. In practice, however, it is found that some infections are more suited than others to this form of study. Among the disadvantages of the methods, and in common with all other immunological procedures, is the occurrence of nonspecific and false-positive reactions. The incorporation of rigid controls is therefore essential.

7047

Jentzsch, K.D. 1963. The significance of fluorescent antibody in diagnosis and research. Monatsschr. Veterinaermed. 18:123-128. In German.

The advantages of fluorescent antibody use in diagnosis and research are listed. Examples and suggestions are cited to show that the procedure is well suited for practical diagnosis in special cases, and may also be used successfully in research. However, for practical application, tested methods must be established for bacteriological test sites and corresponding marked immune sera must be at hand so that the procedure can meet expectations with regard to time and material economy.

7048

Kagan, I.G. 1965. Evaluation of routine serologic testing for parasitic diseases. Amer. J. Public Health 55:1820-1829.

As one of the tests used for serodiagnosis of certain parasitic diseases, FA is discussed and analyzed. FA has found use in schistosomiasis, ascariasis, trichinosis, filariasis, Chagas' disease, leishmaniasis, toxoplasmosis, amebiasis, and malaria. Application of some of these tests approaches routine use.

7049

Koch, R.A. 1964. Late syphilis: Modern concepts and treatment. J. Amer. Geriat. Soc. 12:255-261.

The FTA test is briefly mentioned as new and perhaps better than the TPI test for syphilis diagnosis.

7050

Kunkel, H.G.; Tan, E.M. 1964. Autoantibodies and disease, p. 351-395. In Advances in Immunology, Vol. 4. Academic Press, New York.

In this general discussion of the nature and pathogenesis of autoantibodies, FA is frequently cited as a major tool for study and diagnosis of these diseases.

7051

Lipnicki, B.; Reiss, J. 1964. On the use of immunofluorescent diagnosis in infectious diseases. Postepy Hig. Med. Dosw. 18:663-680. In Polish.

This is a review. The authors feel that FA has not replaced any conventional diagnostic test.

7052

Liu, C. 1963. Immunofluorescent technique: Application in the study and diagnosis of infectious diseases. Clin. Pediat. 2:490-497.

In this review an effort has been made to summarize some of the results of the fluorescent antibody technique in the study of infectious diseases in pediatric practice. Although the FA technique is a competent tool in combining serological specificity and morphological identification of antigens sought in microorganisms, its application must be carefully controlled to avoid cross-reactions and its results must be cautiously interpreted after meticulous comparisons with conventional methods. At present, its usefulness is still largely confined to investigators highly trained in serological and immunological disciplines. As information is gradually accumulated, contributions to the understanding of infectious disease, both in basic studies and clinical applications for rapid diagnosis, will be invaluable

7053

Manikowska-Lesinska, W. 1964. Immunofluorescence test in the diagnosis of syphilis. Pol. Tyg. Lek. 19:1833-1834. In Polish.

An immunofluorescent test for specific antibodies in syphilic sera is described. Due to its sensitiveness, replicability, high specificity, and rather low cost, the procedure is useful in mass serological examinations.

7054

Marmion, B.P. 1963. Applications of immunofluorescence in virology. Proc. Roy. Soc. Med. 56:481.

This is a review of applications and some comment on methods. Reasons are advanced for the relative lack of progress in practical diagnostic virology: (1) With most virus infections diagnosis by the cheap and sensitive retrospective serological method provides all the information required. (2) Simpler, sensitive, and reasonably quick serological or cultural methods of diagnosis already exist with some viral infections, viz.: poliomyelitis, smallpox. (3) The collection of adequate specimens from the site of infection requires careful timing and technique.

7055

Miller, J.N.; Boak, R.A.; Carpenter, C.M.; Fazzan, F. 1963. Immunofluorescent methods in the diagnosis of infectious diseases. Amer. J. Med. Technol. 29:25-32.

This is a review of basic principles and some applications of FA.

7056

Miller, J.N.; Boak, Ruth A.; Carpenter, C.M.; Fazzan, F. 1963. Immunofluorescent methods in the diagnosis of infectious diseases. Laboratorio 18:223-232. In Spanish.

This is a technique and procedure review.

7057

Nahmias, A.J.; Brahen, L.; Luce, C. 1965. Fluorescent-antibody technique in the rapid diagnosis of clinical bacterial infections. Antimicrobial Agents and Chemotherapy 1965:84-90.

To date only limited application of FA as a clinically useful, rapid diagnostic test has been reported in bacterial infections affecting hospitalized patients. A continuing evaluation of this technique, with comparison with standard bacteriological procedures and correlation with clinical data, has been conducted in a large general hospital. Specimens from more than 1500 patients suspected of having a variety of bacterial infections have been studied over a 10-month period. These specimens included: spinal fluids; petechial smears; joint, tracheal, and pleural aspirates; sputa; exudates; and rectal and throat swabs. The following FA conjugates were used: Haemophilus influenzae (pool of six types), Diplococcus pneumoniae (pool of 31 types), Neisseria

meningitidis (pool of three groups), N. gonorrhoeae, Group A streptococci, Corynebacterium diphtheriae, Bordetella pertussis and B. parapertussis, Staphylococcus aureus, and enteropathogenic Escherichia coli (pool of nine serogroups). The FA technique has been particularly effective when the specimen examined usually contains only one organism. FA technique will be a valuable adjunct in the rapid and specific diagnosis of certain clinical bacterial infections. FA should not supplant the Gram stain and cultural procedures.

7058

Naumann, G.; Wildfuhr, G. 1965. The significance of immunofluorescence for serodiagnosis of infectious diseases. Munchen Med. Wochensch. 107:1384-1386. In German.

The author discusses the results obtained by the immunofluorescence method in serodiagnosis of various infectious diseases. Comparative studies with standard methods show that this method is of greater significance in serological diagnosis of syphilis, toxoplasmosis, pseudotuberculosis, cryptococcosis, and trichinellosis.

7059

Nicholas, L.; Beerman, J. 1965 Present-day serodiagnosis of syphilis: A review of some of the recent literature. Amer. J. Med. Sci 249:466-483.

This is a review including FA.

7060

Petzoldt, D. 1964 The FTA test. Principles, methodology, and results. Med. Weltkongr. 6:282-290. In German

The FTA test for syphilis is described. Previously published test results place the FTA test equal to the TPI test. The results of the FTA tests are absolutely comparable with those of the TPI test and excel those of the classic serological reactions. The relatively simple FTA test allows its use even in small laboratories and will assure it a firm place in serological syphilis diagnosis in the future.

7061

Poetschke, G. 1964. Fluorescence-labeled antibodies in research and diagnosis: I. Materials and methods. Arztl. Lab. 10:353-360. In German.

This short review given an introduction into the principles and possibilities of the application of fluorescent antibodies for research and diagnosis. The fluorescent dyes generally used for labeling protein, the microscope equipment, and the usual methods for demonstrating antigens or antibodies, including different controls, are discussed briefly.

7062

Riggs, J.L. 1965. Application of fluorescent antibody techniques to viral infections. Ind. Med. Surg. 34:269-277.

This is a brief review of some viral diagnostic applications of FA.

7063

Rosenblum, B.F. 1963. Recent advances in diagnosis and treatment of veneral diseases. Public Health Re. 78:611-617.

In this review of the over-all problem, FTA is mentioned as a laboratory tool.

7064

Schaeffer, M.; Orsi, E.V.; Widelock, D. 1964. Applications of immunofluorescence in public health virology. Bacteriol. Rev. 28:402-408.

This is an up-to-date review of the status of viral diagnostic FA tests, including those being actively employed by public health laboratories and some with potential for the near future. A consideration of nonspecific fluorescence problems and solutions is included. Virus diseases discussed include rabies, smallpox, varicella, and rubella.

7065

Sherris, J.C. 1963. Some recent advances in diagnostic medical bacteriology. Annu. Rev. Microbio. 17:565-592.

Among other methods, FA is given considerable discussion. Origins, preparative procedures, and applications are discussed.

7066

Smyth, C.J. 1964. Rheumatism and arthritis: Review of American and English literature of recent years (Sixteenth Rheumatism Review). Ann. Intern. Med. 61:Suppl. 6:3-102.

In this general review, FA is mentioned for the various roles it has played in research and diagnosis of rheumatoid diseases. These uses include demonstration of the cellular origin of rheumatoid factors.

7067

Stadtsbaeder, S. 1964. Immunofluorescence in clinical biology. Acta Clin. Belg. 19:212-216. In French.

This is a review of FA applications in serologic diagnosis of syphilis, demonstration of ANF, and the study of anticellular antibodies.

7068

Taylor, C.E.D. 1965. Techniques in immuno-chemistry: Fluorescent antibodies. Brit. Med. J. 2:227.

This is a brief review of the FA test and some diagnostic applications. FA tests for syphilis and toxoplasmosis are simpler and quicker than standard procedures. Provisional identification with more than 95 per cent reliability is available in FA tests for many microorganisms, including viruses of rabies and smallpox.

7069

Thiago de Mello, M. 1964. Advances in the diagnosis of brucellosis in man and other animals. Rev. Med. Hosp. Gen. 27:301-307. In Spanish.

Isolation and culture of brucellae are reviewed. The following diagnostic tests are evaluated: agglutination tests, complement fixation test, other serological tests, surface fixation, direct and indirect fluorescent antibody tests, 'label' (card) test, milk tests, and allergy tests. The major problems encountered in diagnosis of brucellosis in man and animals are absence of standardization of antigens and procedures and an insufficient number of comparative tests related to clinical evidence.

7070

Thivolet, J.; Kratchko, A.; Sepetdjian, M. 1963. Use of immunofluorescence method in immunological diagnosis: Practical applications. Presse Med. 71:2740-2742. In French.

This brief review of the applications of the immunofluorescence method in immunological diagnosis indicates the gap still existing between the rather numerous preliminary studies and their extension to broad practical use. The field of application could well be expanded to confirm basic premises.

7071

Thomason, B.M.; Cherry, W.B. 1963. Immunofluorescence techniques in the diagnosis of infections due to enteropathogenic Escherichia coli. Rev. Latinoamer. Microbiol. 6:63-76.

Technical aspects of FA are reviewed. The greatest value of this procedure is in rapid detection of symptomatic or asymptomatic individuals. This procedure is of great value in the monitoring of pediatric hospital admissions, in the management of institutional outbreaks, and in surveys of community population groups.

7072

Wallace, A.L. 1965. Trends and uses of various tests in syphilis serology today. Amer. J. Clin. Pathol. 44:712-719.

Definite trends in syphilis serology are seen in the replacement of lipoidal antigens with cardiolipin antigens, the use of nontreponemal slide test instead of tube tests, routine quantitation of all reactive specimens, and the adoption of the simpler treponemal antigen tests for use in public health, private, and hospital laboratories. The background, reagents, techniques, and uses of nontreponemal and treponemal tests are discussed. Modifications of FTA are compared. Efforts directed toward the standardization of test techniques and improvement of test performance have included training, laboratory consultations, and evaluation studies. Manuals of test procedures and films have been developed as training aids.

7073

Wood, R.M. 1964. Identification of viruses. Int. Ophthalmol. Clin. 4:301-310.

This summary and review of techniques includes FA. The advantages of FA are discussed with reference to virus disease diagnosis, principally early results.

7074

Young, R.M. 1965. New diagnostic techniques: Fluorescent antibody; fluorescent dyes attached to antibodies offer promising new approach to immunological diagnosis and research. Rhode Island Med. J. 48:372-374.

This review discusses principles and some diagnostic applications of FA.

C. APPLICABLE TO PHYSIOLOGY

7075

Anonymous. 1963. Coombs' test and variants. Bibl. Haematol. 14:3-30.

Fluorescent antiglobulin tests are reported in their application to study of antinuclear factor, Hashimoto's disease, and experimental aspermatogenesis.

7076

Asherson, G.L. 1964. Experimental production of autoantibody to gut antigens. Proc. Roy. Soc. Med. 57:813-814.

This is a review of methods. Autoantibody in ulcerative colitis may be due to bacterial immunizations.

7077

Benacerraf, B.; McCluskey, R.T. 1963. Methods of immunologic injury to tissues. Annu. Rev. Microbiol. 17:263-284.

The morphologic relationship of various antigens to damaged tissues, as revealed by FA, is discussed. Hetero-antibodies and autoimmune situations are among the topics included.

7078

Bonomo, L. 1964. A study of rheumatoid factor in various tissues by immunofluorescence. Riv. Ist. Sieroterap. Ital. 39:201-203. In Italian.

A review.

7079

Burrell, R.G. 1963. Autoantibodies in pulmonary disease. Amer. Rev. Resp. Dis. 87:389-394.

As a portion of this review, FA studies of kidney, lung, and other tissues are discussed.

7080

Couchman, K.G.; Wigley, R.D. 1965. The antinuclear factor test in diagnostics. New Zeal. Med. J. 64:151-152.

This is a review of diagnostic tests for SLE. FA was used as a diagnostic test.

7081

Del Giacco, G.S. 1964. The contribution of immunofluorescence to some fields of physiopathology. Policlinico 71:913-928. In Italian.

This is a review of FA applications to various collagen and autoimmune diseases.

7082

Fink, M.A.; Malmgren, R.A.; Karon, M.; Orr, H.C. 1965. Immunofluorescence studies in human leukemia. Wistar Inst. Symp. Monogr. (4):187-196.

This is a review of published works on leukemia using FA as a study method. Techniques for reagent preparation are given. Problems in use of FA and interpretation of results are discussed.

7083

Franklin, E.C. 1963. The immune globulins. Arth. Rheum. 6:381-385.

In recent years the complex and biologically important group of antibody proteins has been united into a structurally, functionally, and genetically closely related protein group. The group term is immune globulins. FA has been useful in studying this group by localizing sites of gamma globulin synthesis in plasma cells, and in some instances in lymphocytes and transitional cells.

7084

Friou, G.J. 1964. Immunofluorescence and antinuclear antibodies. Arth. Rheum. 7:161-166.

The search for anti-tissue antibodies in human disease started early in the history of immunology, but for many years there was little progress. Development of the immunofluorescent technique has been the single factor of greatest importance. Specificity of FA reactions is discussed. Future extensions of FA in this area may be tracing antigenic sites of specific globulins and relating them to disease problems.

7085

Heimpel, H.; Mueller, W. 1963. Immunothyroiditis. Ergeb. Inn. Med. Kinderheilk. 19:380-445. In German.

This is a comprehensive review. FA is discussed and described in its role in diagnosis and research.

7086

Kaplan, M.H. 1965. Immunologic mechanisms in injury or disease of vascular, renal, and cardiac tissue: Introductory remarks Federation Proc. 23:93

As a portion of this introduction the observation is made that the use of labeling methods, employing immunohistochemical reagents, has provided new investigative approaches to identification of anatomic sites where immune reactants may be localized.

7087

Kornstad, L. 1964. Immunopathology of the thyroid gland. Tidsskr. Norske Laegeforen. 84:74-79. In Norwegian.

Chronic thyroiditis in man is one of the few illnesses which comes close to meeting the criteria for an autoimmune disease. Experimental autoimmune thyroiditis production in animals is reviewed. Although the antibodies found in experimental autoimmune thyroiditis are directed, as far as known, against only thyroglobulin, it seems that in human illness there are many thyroid-specific antigens which are effective. The immunofluorescence technique can be used to demonstrate antibodies against a variety of thyroid-specific antigens. Some antibodies can occur in other thyroid illnesses, as well as in presumptively healthy individuals. Clinically diagnosable autoimmune thyroiditis is more frequent in females than in males. Speculation is made on the mechanism for the production of thyroid autoantibodies in man. Genetic factors may play the largest part in development of autoimmune thyroiditis.

7088

Kraft, S.C.; Kirsher, J.B. 1964. Immunofluorescent studies of chronic nonspecific ulcerative colitis. Gastroenterology 46:329-332.

This review is a valuable general reference on the subject.

7089

Lipnicki, B. 1965. Application of fluorescent antibodies in examining the structure of the eyeball. Postepy Hig. Med. Dosw. 19:459-467. In Polish.

The literature discussing application of fluorescent antibody techniques to study of the eyeball encompasses three areas: search for infection factors, in particular bacteria such as Leptospira pomona and Streptococcus pyogenes, smallpox viruses, Toxoplasma gondii, and agents in cold sores and trachoma; the localization of local production of antibodies; and the antigen structure of the fibers of the eye of mature individuals and in the phase of embryogenesis. Specific examples drawn from the literature are described.

7090

Luporini, G. 1964. Biological and clinical foundations of autoimmune diseases: Methods of testing for autoantibody; criteria for selection and evaluation. Riv. Ist. Sieroterap. Ital. 39:191-199. In Italian.

In demonstrating autoantibodies, none of the techniques available fully meets all of the requirements; therefore, 'screening,' including the following methods, is desirable: precipitation, agglutination, complement fixation, LE cell test, and immunofluorescence.

7091

Marmont, A. 1964. Theoretical and practical aspects of antinuclear autoimmunity. Riv. Ist. Sieroterap. Ital. 39:147-165. In Italian.

This is a general review of antinuclear reactions and related diseases. FA was used in the ANF test.

7092

Marmont, A.; Damasio, E. 1963. The antinuclear factors in so-called malignant rheumatoid arthritis. Reumatismo 15:163-186. In Italian.

This review mentions FA tests for ANF.

7093

Moller, G. 1964. Fluorescent antibody technique for demonstration of isoantigens in mice. Methods Med. Res. 10:58-69.

FA applications in this area of investigation are generally reviewed. Various reactions are categorized.

7094

Sherman, W.B. 1964. Autoimmune mechanism. Penn. Med. J. 67:25-31.

This is a review of autoimmune phenomena. Reference is made to the use of FA in the study of this problem.

7095

Smyth, C.J. 1963. Rheumatism and arthritis: Review of American and English literature of recent years (Fifteenth Rheumatism Review). Ann. Intern. Med. 59:Suppl. 4:3-125.

As a part of this review, FA is mentioned for its role in demonstrating rheumatoid factor and autoimmune reactions.

7096

Strauss, A.J.L. 1965. Autoimmunity in myasthenia gravis. Brit. Med. J. 1965:1245-1246.

This paper reviews work on myasthenia gravis and discusses implications. It is felt that autoimmune processes, although present, are not a prime factor.

7097

Szulman, A.E. 1965. The ABH antigens in human tissues and secretions during embryonal development J. Histochem. Cytochem. 13:752-754.

This review outlines the methods and results thus far obtained in tracing distribution of blood group antigens.

7098

Torrigiani, G. 1963. Methods for the detection of auto-antibodies. Acta Allergol. 18:489-494.

FA is one of the methods discussed.

7099

Waaler, E. 1964. Pa hological-anatomical changes in diseases with possible immunological pathogenesis. Tidsskr. Norske Laegeforen. 84:55-60. In Norwegian.

Etiology and pathogenesis of four diseases of possible immunological nature are discussed. Among methods used to study these diseases, the fluorescent method is invaluable. Pathologic and immunologic features of polyarteritis nodosa, glomerulonephritis, acute rheumatic disease, and rheumatoid arteritis are reviewed and discussed. The significance of the role played by auto-immunity is uncertain. Strong evidence exists toward implicating a hypersensitivity reaction in all these four conditions. The biologically active substance is an antigen-antibody complex with an antigen surplus, pointing toward a hypoimmunity mechanism.

D. APPLICABLE TO MICROBIAL DISEASES AND PARASITIC INFECTIONS

7100

Apted, F.I.C. 1964. Summary of recent abstracts: VIII. Rickettsial diseases. Trop. Dis. Bull. 61:981-988.

This is a review in which FA identification is mentioned.

7101

Bryan, W.R. 1965. Discussion of: A survey of the tumor virus problem from an epidemiologic standpoint. Cancer Res. 25:1283-1285.

As a portion of this review of tumor virus epidemiology, the usefulness of FA in detection and identification of virus antigen is discussed.

7102

Fulton, J.D. 1963. Acquired immunity: Protozoal infections, p. 145-160. In Modern Trends in Immunology, Vol. 1. Butterworth & Co., London.

As a portion of this review, the applications of FA to study of certain protozoan diseases are discussed. These include amebiasis, trypanosomiasis, trichomoniasis, and malaria.

7103

Hayflick, L.; Chanock, R.M. 1965. Mycoplasma species of man. Bacteriol. Rev. 29:185-221.

As a portion of this review covering all important aspects of the subject, FA is mentioned in its role of antibody titration and use in defining Mycoplasma infections of tissue cultures.

7104

Horstmann, D.M. 1965. Clinical virology. Amer. J. Med. 38:738-750.

As a part of this procedure and application review, FA techniques are discussed for rapid presumptive diagnosis of generalized vaccinia infection from skin lesion specimens.

7105

Mathe, G. 1964. Virus and human leukemia. Presse Med. 72:2831-2832. In French.

Abundant data concerning the relationship between the presence of intracellular carcinogenic particles or factors in some tissues or fluids of leukemia or lymphosarcoma patients were obtained in 1964. Observations on this relationship here cover the most important points. Difficulties and limits of data interpretation are discussed. The principal stumbling block is that difficulties are more of method than of technique. Progress in epidemiology, electron microscopy, immunology, culture and heterospecific transmission of virus is amazing. However, no one method is actually available to cause cancer in a particular cellular structure and to attribute this cancer to the specific introduced agent with certainty. It is possible that the use of organ culture techniques or those of heterospecific nature can offer a solution to this problem.

7106

McKhann, C.F. 1965. Methods of detecting cancer antigens and antitumor antibody. Federation Proc. 24:1033-1036.

FA is an important method for studying virus-induced cancers. A number of the principles demonstrated by FA are pointed out before the author goes on to discuss other methods that are the prime point of the report.

7107

Mihail, A. 1963. Immunofluorescence in inframicrobiological research. Stud. Cercet. Inframicrobiol. 14:481-489. In Rumanian.

This is a review.

7108

Mims, C.A. 1964. Aspects of the pathogenesis of virus diseases. Bacteriol. Rev. 28:30-71.

In this survey of the pathogenesis of virus infections, the usefulness of the fluorescent antibody technique has been emphasized and certain neglected topics are discussed. The poxviruses figure prominently because the fluorescent antibody technique works well for these viruses. A large section deals with macrophages in virus diseases. Macrophages phagocytize virus particles. Because they are widely distributed throughout the body and monitor the main body fluids and tissue spaces, they encounter virus particles early in infection. All possible types of virus-macrophage interaction have been shown to occur in the liver and macrophages play

an important part in the growth of viruses in this organ. Most of the experimental evidence implicating macrophages has been obtained from fluorescent antibody studies of mice infected with ectromelia virus. The conditions for the establishment and maintenance of viremia have to be considered in relation to the clearance of virus from the blood by macrophages. If viruses that infect capillary endothelium are also cleared from the blood by macrophages, the infection of capillary endothelium will be influenced by the activity of macrophages. Experiments on the growth of ectromelia virus in spleen and lymph nodes are described. The immune response is discussed. Short accounts are given of virus infections of certain other organs and tissues.

7109

Moore, A.E. 1963. Consideration of means for determining if viruses are causally related to cancer in man. Progr. Med. Virol. 5:295-306.

This is a review of the relation of viruses to certain cancers. FA tests are briefly mentioned.

7110

Petty, C.S. 1965. Botulism: The disease and the toxin. Amer. J. Med. Sci. 249:345-359.

As a portion of this extensive review of botulism, FA is mentioned as a method for identifying the organism.

7111

Rowe, W.P. 1965. Fluorescent antibody studies of virus-induced tumors. J. Histochem. Cytochem. 13:755-758.

This review details the development of FA application to tumor virus detection and localization. It places in perspective many of the relationships between certain tumors and viruses.

7112

Sadun, E.H. 1963. Seminar on immunity to parasitic helminths: VII. Fluorescent antibody technique for helminth infections. Exp. Parasitol. 13:72-82.

The fluorescent antibody test has great possibilities in the field of helminthology. However, this subject will be really fruitful only if scientists will keep in mind that it should not be exploited just as a research spectacular. If it is regarded as an adventure of the human spirit, as an artistic enterprise stimulated by curiosity and served by disciplined imagination, research can be successful. FA applications, present and potential, for helminth serological study are discussed.

7113

Voller, A. 1964. Comments on the detection of malaria antibodies. Amer. J. Trop. Med. Hyg. 13:Suppl.:204-208.

Various serologic procedures used to detect malaria antibodies, including FA, are discussed. Specificity and cross-reaction problems receive comment. The hope is expressed that some of these methods may be refined to a point where they may be used diagnostically, perhaps before appearance of circulating stages.

7114

Voller, A. 1964. Fluorescent antibody methods and their use in malaria research. Bull. WHO 30:343-354.

This is a review of applications. It contains detailed instruction for the use of FA in malarial studies.

II. REFERENCES TO DIAGNOSTIC APPLICATIONS

A. BACTERIA

1. Actinomycetales

7115
Cottenot, F. 1964. Quantitative evaluation of murine leprosy bacillus for detection of serum antibody in human leprosy. See MP 20, Vol. I, No. 5006.

2. Bacillaceae

7116
Batty, I.; Walker, P.D. 1964. The identification of Clostridium novyi (Clostridium oedematiens) and Clostridium tetani by the use of fluorescent labeled antibodies. See MP 20, Vol. I, No. 5020.

7117
Franek, J. 1965. Use of fluorescent antibodies for the rapid diagnosis of infections caused by B. anthracis and P. tularensis. See MP 20, Vol. I, No. 5030.

7118
Nikitin, V.M. 1964. The use of immunofluorescent paper disks for the rapid detection of pathogenic microbes. See MP 20, Vol. I, No. 5036.

7119
Ponomareva, T.N. 1963. On bacteriological diagnosis of anthrax. See MP 20, Vol. I, No. 5038.

3. Bedsonia (Miyagawanella)

7120
Goldin, R.B.; Krasnik, F.I. 1963. Use of complete and incomplete fluorescent antibodies for detection of virus of ornithosis (experimental material). See MP 20, Vol. I, No. 5049.

7121
Hahon, N.; Nakamura, R.M. 1964. Quantitative assay of psittacosis virus by the fluorescent cell-counting technique. See MP 20, Vol. I, No. 5050.

7122
Hanna, L.; Okumoto, M.; Thygeson, P.; Rose, L.; Dawson, C.R. 1965. TRIC agents isolated in the United States: X. Immunofluorescence in the diagnosis of TRIC agent infection in man. See MP 20, Vol. I, No. 5054.

7123
Tokarevich, K.N.; Krasnik, F.I.; Goldin, R.B. 1963. The use of fluorescent antibody technique in serological diagnosis of ornithosis. See MP 20, Vol. I, No. 5064.

7124
Tokarevich, K.N.; Krasnik, F.I.; Goldin, R.B. 1963. Serodiagnosis of ornithosis infection by the immunofluorescent method. See MP 20, Vol. I, No. 5065.

7125
Zelenkova, L.; Strauss, J. 1963. Fluorescent antibody tests in the diagnosis of ornithosis. See MP 20, Vol. I, No. 5066.

4. Brucellaceae

7126
Ananova, Ye.V.; Yemelyanova, O.S. 1964. Application of the fluorescence serological method for detection of the tularemia microbe. See MP 20, Vol. I, No. 5067.

7127
Biegeleisen, J.Z., Jr.; Mitchell, M.S.; Marcus, B.B.; Rhoden, D.L.; Blumberg, R.W. 1965. Immunofluorescence techniques for demonstrating bacterial pathogens associated with cerebrospinal meningitis: I. Clinical evaluation of conjugates on smears prepared directly from cerebrospinal fluid sediments. See MP 20, Vol. I, No. 5072.

7128
Franek, J. 1965. Use of fluorescent antibodies for the rapid diagnosis of infections caused by B. anthracis and P. tularensis. See MP 20, Vol. I, No. 5073.

7129
Franek, J.; Prochazka, O. 1965. Fluorescent antibody demonstration of Pasteurella tularensis. See MP 20, Vol. I, No. 5074.

7130
Franek, J.; Wolfova, J. 1965. Use of the immunofluorescence method in an epidemic focus of tularemia. See MP 20, Vol. I, No. 5075.

7131
Grossman, M.; Sussman, S.; Gottfried, D.; Quock, C.; Ticknor, W. 1964. Immunofluorescent techniques in bacterial meningitis: Identification of Neisseria meningitidis and Hemophilus influenzae. See MP 20, Vol. I, No. 5076.

7132
Hollerda, J.; Eldering, G. 1963. Culture and fluorescent antibody methods in diagnosis of whooping cough. See MP 20, Vol. I, No. 5078.

7133
Jentzsch, K.D. 1963. Study of brucellae with fluorescent antibody: 3. Indirect staining of Brucella antibody in bovine serum with fluorescent conjugates. See MP 20, Vol. I, No. 5079.

7134
Jentzsch, K.D.; Axt, J. 1963. Study of brucellae with fluorescent antibodies: 2. Proof of the specificity of labeled antisera. See MP 20, Vol. I, No. 5081.

7135
Karakawa, W.W.; Sedgwick, A.K.; Borman, E.K. 1964. Typing of Haemophilus influenzae with fluorescent antibody reagent. See MP 20, Vol. I, No. 5082.

7136
Marie, J.; Herzog, F.; Badillet, M.; Gaiffe, M. 1964. Diagnosis of whooping cough by the immunofluorescence technique. See MP 20, Vol. I, No. 5086.

7137
Mitchell, M.S.; Marcus, B.B.; Biegeleisen, J.Z., Jr. 1965. Immunofluorescence techniques for demonstrating bacterial pathogens associated with cerebrospinal meningitis: II. Growth, viability, and immunofluorescent staining of Hemophilus influenzae, Neisseria meningitidis, and Diplococcus pneumoniae in cerebrospinal fluid. See MP 20, Vol. I, No. 5090.

7138
Nelson, J.D.; Hempstead, B.; Tanaka, R.; Pauls, F.P. 1964. Fluorescent antibody diagnosis of infections. See MP 20, Vol. I, No. 5091.

7139
Nikitin, V.M. 1964. The use of immunofluorescent paper disks for the rapid detection of pathogenic microbes. See MP 20, Vol. I, No. 5092.

7140
Ocklitz, H.W.; Boigk, J.; Hahn, M. 1965. The clinical picture of pertussis diagnosed with immunofluorescence and culture methods. See MP 20, Vol. I, No. 5093.

7141
Ocklitz, H.W.; Weppe, C.-M., Hahn, M. 1964. The bacteriological diagnosis of pertussis; fluorescence serology and culturing compared: III. Results of the comparison of both methods. See MP 20, Vol. I, No. 5095.

7142
Pittman, B.; Cherry, W.B. 1965. Study of factors which affect the identification of Bordetella pertussis obtained by nasopharyngeal swabs. See MP 20, Vol. I, No. 5096.

7143
Redmond, D.L.; Kotcher, E. 1963. Comparison of cultural and immunofluorescent procedures in the identificiation of Haemophilus vaginalis. See MP 20, Vol. I, No. 5100.

7144
Schmidt, J. 1965. Studies on fluorescence serologic detection of Pasteurella pseudotuberculosis antibodies. See MP 20, Vol. I, No. 5103.

7145
Schmidt, J. 1965. Comparative studies on the detection of Pasteurella pseudotuberculosis antibodies by indirect fluorescent serological methods and by the Widal reaction. See MP 20 Vol. I, No. 5104.

7146
van Drimmelen, C.C.; Botes, H.J.W.; Claassen, N.; Ross, W.P.; Viljoen, M. 1963. Fluorescent antibody for the diagnosis of Br. ovigenitalium infection in sheep semen smears. See MP 20, Vol. I, No. 5110.

7147
White, L.A.; Deacon, W.E. 1964. Identification of Haemophilus ducreyi by the fluorescent antibody technique. See MP 20, Vol. I, No. 5113.

7148
Zak, K.; Vesnik, Zd. 1963. The possibilities of detection of Brucella antigens by fluorescent antibodies in gynecology. See MP 20, Vol. I, No. 5114.

5. Corynebacteriaceae

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Allen, J.C.; Cluff, L.E. 1963. Identification of toxinogenic C. diphtheriae with fluorescent antitoxin: Demonstration of its nonspecificity. See MP 20, Vol. I, No. 5115.

7150
Biegeleisen, J.Z., Jr. 1964. Immunofluorescence techniques in retrospective diagnosis of human listeriosis. See MP 20, Vol. I, No. 5117.

7151
Biegeleisen, J.Z., Jr.; Mitchell, M.S.; Marcus, B.B.; Rhoden, D.L.; Blumberg, R.W. 1965. Immunofluorescence techniques for demonstrating bacterial pathogens associated with cerebrospinal meningitis: I. Clinical evaluation of conjugates on smears prepared directly from cerebrospinal fluid sediments. See MP 20, Vol. I, No. 5118.

7152
Eveland, W.C. 1963. Fluorescent antibody studies on Listeria monocytogenes. See MP 20, Vol. I, No. 5121.

7153
Eveland, W.C. 1963. Demonstration of Listeria monocytogenes in direct examination of spinal fluid by fluorescent antibody technique. See MP 20, Vol. I, No. 5122.

7154
Gulmezoglu, E.; Sayre, J.W. 1964. The use of fluorescent labelled diphtheria antitoxin for the diagnosis of diphtheria cases. See MP 20, Vol. I, No. 5123.

7155
Moody, M.D.; Jones, W.L. 1963. Identification of Corynebacterium diphtheriae with fluorescent antibacterial reagents. See MP 20, Vol. I, No. 5128.

7156
Nelson, J.D.; Shelton, S. 1963. Immunofluorescent studies of Listeria monocytogenes and Erysipelothrix insidicsa: Application to clinical diagnosis. See MP 20, Vol. I, No. 5130.

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Scarpa, B. 1963. Immunofluorescent reaction in the diagnosis of diphtheria: II. Practical applications. See MP 20, Vol. I, No. 5133.

58
Vellella, R.L.; Halling, L.W.; Biegeleisen, J.Z., Jr. 1963. A case of listeriosis of the newborn with fluorescent antibody histologic studies. See MP 20, Vol. I, No. 5136.

6. Enterobacteriaceae

7159
Biegeleisen, J.Z., Jr.; Mitchell, M.S.; Marcus, B.B.; Rhoden, D.L.: Blumberg, R.W. 1965. Immunofluorescence techniques for demonstrating bacterial pathogens associated with cerebrospinal meningitis: I. Clinical evaluation of conjugates on smears prepared directly from cerebrospinal fluid sediments. See MP 20, Vol. I, No. 5144.

7160
Boris, M.; Thomason, B.M.; Hines, V.D.; Montague, T.S.; Sellers, T.F., Jr. 1964. A community epidemic of enteropathogenic Escherichia coli 0126:B16:NM gastroenteritis associated with asymptomatic respiratory infection. See MP 20, Vol. I, No. 5145.

7161
Bradstreet, C.M.P. 1965. Immunofluorescence in the diagnosis of enteropathogenic Escherichia coli infections. See MP 20, Vol. I, No. 5146.

7162
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7163
Danielsson, D.; Laurell, G.; Sjolin, S. 1965. An outbreak of diarrhea due to enteropathogenic Escherichia coli studied by means of fluorescent antibody identification and conventional bacteriological culture. See MP 20, Vol. I, No. 5163.

7164
Davis, B.R.; Ewing, W.H. 1963. Serologic relations that may lead to erroneous diagnoses of Escherichia coli infections by means of fluorescent antibody technics. See MP 20, Vol. I, No. 5164.

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de la Vaissiere, C.; Goiffon, B. 1963. Diagnosis of toxic gastroenteritis due to pathogenic colibacilli in infants by means of immunofluorescence. See MP 20, Vol. I, No. 5165.

7166
Demissie, A. 1965. Immunofluorescence identification of Salmonella in fecal specimens. See MP 20, Vol. I, No. 5167.

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Freid, M.A.; Lepper, M. 1965. Endemicity of enteropathogenic Escherichia coli: Studies of screening procedures. See MP 20, Vol. I, No. 5172.

7168
Geck, P.; Gago, G.; Kovacs, S. 1965. Immunofluorescent tests and their significance in controlling dyspepsia coli. See MP 20, Vol. I, No. 5173.

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Geck, P.; Osvath, P.; Voltay, B.; Backhausz, R.; Losonczy, G.; Vigh, G.; Bognar, S. 1963. Immunofluorescence and passive haemagglutination in infantile enterocolitis. See MP 20, Vol. I, No. 5174.

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Geck, P.; Szanto, R. 1964. Comparative examination of chronic typhoid carriers with immunofluorescent and cultural methods. See MP 20, Vol. I, No. 5175.

7171
Guardiola-Rotger, A.; Lopez, V.A. 1964. An outbreak of diarrhea at the San Juan City Hospital Department of Pediatrics. See MP 20, Vol. I, No. 5180.

7172
Hornung, J.E. 1965. Immunofluorescent studies of Shigella in infants and young children. See MP 20, Vol. I, No. 5190.

7173
Hornung, J.; Weiner, L.M. 1964. Diagnosis of human shigella infections by fluorescent antibody. See MP 20, Vol. I, No. 5191.

7174
Ivanova, S.P.; Bochorishvili, V.G. 1963. Accelerated diagnosis of typhoid-paratyphoid infections. See MP 20, Vol. I, No. 5193.

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7179
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Martin, A.J.; O'Brien, M. 1965. Detection of enteropathogenic Escherichia coli in fecal cultures by use of a modified fluorescent antibody technique. See MP 20, Vol. I, No. 5204.

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Nelson, J.D.; Hempstead, B.; Tanaka, R.; Pauls, F.P. 1964. Fluorescent antibody diagnosis of infections. See MP 20, Vol. I, No. 5209.

7182
Nikitin, V.M. 1964. The use of immunofluorescent paper disks for the rapid detection of pathogenic microbes. See MP 20, Vol. I, No. 5210.

7183
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Shingu, K. 1964. On the detection of dysentery bacilli in feces by the fluorescent antibody technique. See MP 20, Vol. I, No. 5218.

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Stulberg, C.S.; Caldwell, W.J.; Kennedy, D.W.; Page, R.H. 1964. Application of immunofluorescence to an epidemic due to Salmonella typhimurium. See MP 20, Vol. I, No. 5220.

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Taylor, C.E.D.; Heimer, G.V. 1964. Rapid diagnosis of Sonne dysentery by means of immunofluorescence. See MP 20, Vol. I, No. 5222.

7190
Taylor, C.E.D.; Heimer, G.V.; Lea, D.J.; Tomlinson, A.J.H. 1964. A comparison of a fluorescent antibody technique with a cultural method in the detection of infections with Shigella sonnei. See MP 20, Vol. I, No. 5223.

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Taylor, C.E.D.; Lea, D.J.; Heimer, G.V.; Tomlinson, A.J.H. 1963. Fluorescent antibody techniques in diagnostic bacteriology. See MP 20, Vol. I, No. 5224.

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7193
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7194
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7195
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7196
Thomason, B.M.; McWhorter, A.C.; Sanders, E. 1964. Rapid detection of typhoid carriers by means of fluorescent antibody techniques. See MP 20, Vol. I, No. 5229.

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7. Lactobacillaceae

7198
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13. ABSTRACT

This volume is one of a series of six in the second edition of an annotated bibliography on various aspects of immunofluorescence and its use. The first six-volume edition was published in 1965 and included citations for the period 1905 through 1962. The present edition covers the period 1963 through 1965; Volume V is divided into two major sections. The first section contains 104 annotated citations to review articles on immunofluorescence arranged according to major subject areas. The second section is devoted to diagnostic techniques. It contains 321 cross-references to citations in the other volumes of this series, arranged to correspond with subject matter areas in those volumes. A complete author index to the 425 citations is included.

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